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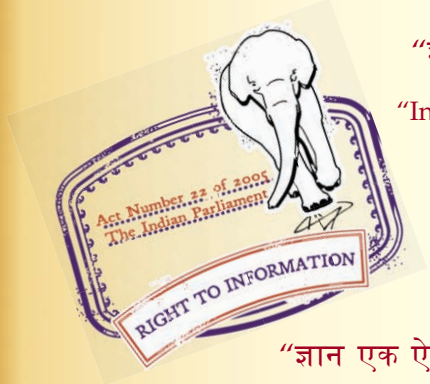

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Indian Standard
METHODS FOR RANDOM SAMPLING

(Eighth Reprint DECEMBER 2002)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 8 *May* 1969

Indian Standard

METHODS FOR RANDOM SAMPLING

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AMENDMENT NO. 1 JULY 1992
TO
IS 4905 : 1968 METHODS FOR RANDOM SAMPLING

(*Page* 14, *Example* 14, *line* 6) — Substitute 'less than or equal to 999' *for* 'less than 999'.

(*Page* 14, *Example* 14, *last sentence*) — Substitute the following for the existing sentence:

'This procedure will result in the rejection of very few numbers— those above 489 and less than or equal to 500 and again those above 989 and less than or equal to 999 (which give remainders greater than 489 when divided by 500), thereby leading to the rejection of only 21 numbers as compared to 510 by the earlier procedure.'

(MSD 3)

Printed at Simco Printing Press, Delhi

Indian Standard
METHODS FOR RANDOM SAMPLING

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 20 December 1968, after the draft finalized by the Methods of Sampling Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Sampling is of fundamental importance for estimating the quality of a lot or ascertaining its conformity to the requirements of a specification. The economy, reliability and practicability of the sampling procedures have made them almost indispensable in most of the industrial and trade applications. However, the reliability of the conclusions drawn on the basis of the sample depends on its representativeness and the method of its selection. Since this vital aspect of sampling has not received wide attention, it was felt desirable to lay down the basic procedures for the selection of a random sample under diverse situations. It is hoped that the sampling methods as laid down in this standard, when implemented, would ensure a truly random and representative sample leading to sound and satisfactory estimation of lot quality.

0.3 This standard is one of a series of Indian Standards relating to techniques of statistical quality control. Other standards published so far in the series are:

IS : 397-1952 Method for statistical quality control during production by the use of control chart

IS : 1548-1960 Manual on basic principles of lot sampling

IS : 2500 (Part I)-1963 Sampling inspection tables: Part I Inspection by attributes and by count of defects

IS : 2500 (Part II)-1965 Sampling inspection tables: Part II Inspection by variables for percent defective

IS : 5002 - 1969 Method for determination of the sample size to estimate the average quality of a lot or a process

0.4 In preparing this standard, considerable assistance has been derived from the following publications:

COCHRAN (W G). Sampling techniques. John Wiley & Sons, Inc, New York.

DEMING (W E). Some theory of sampling. John Wiley & Sons, Inc, New York.

HANSEN (M H), HURWITZ (W N) and MADOW (W G). Sampling survey methods and theory. Vol I Methods and applications, Vol II Theory. John Wiley & Sons, Inc, New York.

SUKHATME (P V). Sampling theory of surveys with applications. Indian Society of Agricultural Statistics, New Delhi.

A million random digits with 100 000 normal deviates. 1955. Rand Corporation, Illinois, USA.

0.5 In reporting the result of a test or analysis, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard lays down general procedures for the selection of items from a lot on an objective basis by using random sampling techniques. It also describes the methods of calculation of simple estimates like mean and proportion of defective from the sample data.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Item — Ultimate unit of product or material which is to be selected.

2.2 Lot (Population) — Totality of items or individuals under consideration.

2.3 Lot Size (N) — Total number of items in the lot.

2.4 Sample — Collection of items selected from the lot (or the population).

2.5 Sample Size (n) — Number of items in the sample.

2.6 Sampling Fraction $\left(\frac{n}{N}\right)$ — Ratio of sample size to the lot size.

2.7 Random Sampling — A procedure of selection in which the chance for the inclusion of any item in the sample is predetermined.

2.8 Defective — An item the quality of which does not meet the specified requirement.

3. RANDOM SAMPLING METHODS

3.1 Simple Random Sampling

3.1.0 In case the lot consists of a number of items such that each item is easily identifiable and, apart from the lot size, no other information about the composition of the lot is available, the method of simple random sampling may be followed for selecting the items for the sample.

*Rules for rounding off numerical values (*revised*).

3.1.1 According to this method, the sample of the requisite size n is drawn from a lot of size N in such a manner that, while selecting an item, the chance for any item of the lot being included in the sample is the same. An item once drawn is not placed back in the lot.

NOTE — In case the item drawn is put back in the lot before the next item is selected, thereby allowing for the possibility of the same item being chosen more than once for inclusion in the sample, the method is usually referred to as simple random sampling with replacement. However, this method of sampling is not commonly used in industrial practice and hence it has been left out from further consideration in this standard.

3.1.2 For the selection of a simple random sample of n items from a lot of N, the first requisite is to obtain n random numbers (*see* **4**) which lie in the range 1 to N. For this purpose, starting from any number of the random number table (*see* Appendix B) and continuing on with the numerals in any direction, right or left, up or down, the succeeding numerals are copied out one-by-one till n different numerals are obtained. The numerals zero or those which are greater than N or which have already occurred, shall be omitted. The numerals noted down in this manner shall then be arranged in the ascending order of magnitude. Starting from any item in the lot and counting them in one order, the items corresponding to the numerals already noted down shall be withdrawn to constitute the required sample of size n.

Example 1:

It is desired to obtain a sample of 10 electrical components from a lot of 200. If the components in the lot are mentally-assigned serial numbers up to 200, the problem then becomes to obtain 10 random numbers in the range 1 to 200. Taking the 3-digited random numbers from Appendix B and starting from any number, say 149, occurring in the eleventh row and 11, 12 and 13 columns on page 19 and proceeding downwards, the numerals less than 200 are noted down. Thus the 10 numerals so obtained are 149, 62, 174, 177, 142, 111, 165, 13, 17 and 194. When arranged in ascending order of magnitude, the numerals become 13, 17, 62, 111, 142, 149, 165, 174, 177 and 194. The electrical components in the lot corresponding to these numbers shall then be selected to constitute the required random sample of size 10.

3.1.2.1 The procedure as given in **3.1.2** may however result in the rejection of a large proportion of the random numbers which exceed the lot size. Hence, an alternative and more convenient method for the selection of random numbers is given in **4.3.**

3.1.3 For a simple random sample of size n, the estimate of the average quality of a lot may be obtained by dividing the sum of the sample test results or observations by the sample size (*see also* **A-1.1**).

Example 2:

For the 10 electrical components selected in Example 1, if the resistance is obtained as 639, 640, 650, 647, 662, 637, 652, 643, 657 and 649Ω, then

$$\text{Average } (\bar{x}) = \frac{639 + \ldots\ldots\ldots\ldots + 649}{10}\ \Omega = \frac{6\,476}{10} = 647{\cdot}6\Omega.$$

Hence 647·6Ω is the estimate of the mean resistance for all the items in the lot.

3.1.4 The estimate of proportion of defectives in the lot may be obtained by dividing the total number of defectives as observed in the sample by the size of the sample (*see also* **A-1.2**).

Example 3:

If the maximum limit for resistance of the component in Example 2 is specified as 655Ω, then there will be two defectives out of 10 for the selected sample. Hence, the estimate of proportion of defectives in the lot is given by $\frac{2}{10} = 0{\cdot}2$ or 20 percent.

3.2 Stratified Sampling

3.2.0 When a lot consists of items which can be divided into a certain number of more homogeneous groups or strata, the method of stratified random sampling may be followed according to which *each* group of stratum is sampled *separately* so as to obtain a sample representative of the entire lot. In such cases, this method of sampling may be generally more efficient than the random sampling as the latter may not always result in the selection of the items from each stratum of the lot, thereby affecting the representativeness of the sample drawn.

3.2.1 The application of the stratified sampling method would require the division of a lot into a suitable number of strata and then the selection of a simple random sample from each of the stratum to make up the desired sample size. For this purpose, the division of a lot into the strata may be undertaken on the basis of the homogeneity of the items within a lot, convenience of sampling or such other considerations which would make the items within each stratum as much alike as possible whereas those between the strata may be as much different as possible. The allocation of the number of items to be selected from each stratum is sometimes done on the basis of the variability of the items within a stratum. But in most of the industrial applications such a knowledge is hardly available in advance and hence the number of items to be selected from the stratum is generally taken to be proportionate to the stratum size, that is, the number of items in the stratum. This procedure known as proportional allocation would have the added advantage of considerably simplifying the estimation of the lot mean or proportion of defectives. It would also be advisable to ensure that a minimum of two items are selected from each stratum.

3.2.2 The selection of the sample items from each of the stratum shall be done on the same lines as given in **3.1.2.**

Example 4:

Suppose a lot of 300 spanners manufactured in three different shifts are packed in three separate boxes of 125, 100 and 75. If a sample of 12 spanners is to be selected from the lot then the three different boxes may be treated as three different strata and 5, 4 and 3 spanners (as obtained by distributing 12 in proportion to the sizes of the 3 boxes) may be selected from the corresponding three boxes. The actual selection of sample items from each stratum would be made as described in Example 1.

3.2.3 For a stratified random sample of size n, the estimate of the lot mean quality will be calculated by dividing the sum of observations from all the strata by the sample size (*see also* **A-2.1**).

Example 5:

If for the 12 spanners selected in Example 4, the hardness (on the Rockwell hardness scale) is obtained as:

39, 39, 42, 45, 43 for the items from the first stratum;

37, 40, 41, 38 for the items from the second stratum; and

40, 38, 40 for the items from the third stratum;

the sum of the observations for the three strata are obtained as 208, 156 and 118.

Hence, the estimate of the mean hardness for the lot

$$= \frac{208 + 156 + 118}{12} = \frac{482}{12} = 40{\cdot}17.$$

3.2.4 The estimate of proportion of defectives in the lot may be calculated by dividing the total number of defectives found in all the strata by the sample size (*see also* **A-2.2**).

Example 6:

If in Example 5, the specified hardness range for the spanners is given as 38 to 42, then the number of spanners not conforming to the hardness requirements are 2, 1 and 0 respectively for the items selected from the three strata.

Hence the estimate of the proportion of spanners not conforming to the hardness requirement in the lot

$$= \frac{2 + 1 + 0}{12} = \frac{3}{12} = 0{\cdot}25 \text{ or } 25 \text{ percent.}$$

3.3 Systematic Sampling

3.3.0 When the items in a lot are presented in an orderly manner (such as piles of asbestos sheets or stacks of cement bags) it is possible to considerably simplify the selection of a random sample of the required size. Instead of choosing the desired number of random numerals and then drawing the items corresponding to these numerals as illustrated in simple random sampling (*see* **3.1.2**), one item is chosen at random from the lot and thereafter the items are selected regularly at predetermined intervals. It has been established that this method of systematic sampling is quite a good approximation to the simple random sampling method described earlier, provided there is no deliberate attempt to manipulate the sequence of the items in the lot in any desired manner while the lot is presented for inspection. Because of its simplicity of operation and the appealing nature of the ' spread ' of the sample items all through the lot, the systematic sampling has found a very wide application in industry as well as in other fields like agricultural and socio-economic surveys.

3.3.1 The method consists of first selecting a single sample item from the population of N items and thereafter selecting items at regular predetermined intervals to make up the desired sample of size n. For this purpose, the integral part of N/n (say r) is taken as the interval and then the items are counted in one order and every rth item thus counted is withdrawn until the sample of required size is obtained.

Example 7:

Suppose a lot of 250 containers of baby food are stored neatly in racks and a sample of 8 containers is to be selected at random.

Calculate the integral part of $\frac{250}{8}$ (31·25) which is 31. Starting from any container (for the choosing of which the help of random number tables may be sought, if necessary), count the containers in one order as 1, 2, 3,....., 31 and so on. Every 31st container so counted shall be chosen till a total of 8 containers are obtained to constitute the desired sample. In this case, the sample containers to be selected are those corresponding to the serial numbers 31, 62, 93, 124, 155, 186, 217 and 248.

3.3.2 For a systematic sample of size n the estimate of the lot average or the proportion of defective in the lot may be worked out using the relevant formulae given in **A-3.1** and **A-3.2** which are similar to those for simple random sampling (*see* **3.1.3** and **3.1.4**).

3.4 Cluster Sampling

3.4.0 When the lot submitted for inspection consists of certain groups of clusters of items, it is sometimes advantageous and economical to select a few

clusters and then examine all the items in the selected clusters. This would be the case, for example, when the lot consists of items packed in cartons and it is either impracticable or costly to repack the cartons opened for selecting sample items. The method has also extensive applications in agricultural and socio-economic surveys. In the former case, for example, if the problem is to estimate the area under a certain crop in a district, it may be simpler and more economical to ascertain the area under crop in all fields of a selected village (cluster) rather than a few fields in each of the villages of the district. It may however be mentioned here that unlike the stratified sampling, satisfactory results for cluster sampling would be obtained when the items within a cluster are quite heterogeneous.

3.4.1 The method consists of selecting a few of the clusters at random without replacement in the first instance. Thereafter, all the items in each of the selected clusters are pooled to obtain the required sample from the lot.

3.4.2 The selection of the sample clusters from the lot shall be done on the same lines as given in **3.1.2.**

Example 8:

In a firm producing BHC technical on a batch process, normally 3 to 5 batches are manufactured in a day. Considering all the batches manufactured in a day as a cluster, if it is decided to sample 5 clusters from a total of 50 obtained during a period of 2 months, then the procedure for the selection of these 5 clusters shall be the same as indicated in Example 1. All the batches produced on each of the selected days (clusters) shall then be tested.

3.4.3 For a random cluster sampling the estimate of the lot mean may be calculated by using the formula given in **A-4.1.**

Example 9:

Let the 5 clusters chosen in Example 8 consist of 5, 4, 5, 2 and 3 batches respectively. Let the hydrolysable chlorine content (in percentage) for the different batches of the selected clusters be obtained as:

	Total
35·8, 35·6, 34·6, 35·9, 36·0	177·9
35·9, 35·9, 36·2, 35·2	143·2
36·0, 36·3, 36·1, 35·9, 35·8	180·1
36·1, 36·3	72·4
34·8, 35·5, 35·6	105·9

If it is known that the total number of 50 clusters consisted of 188 batches in all, then the estimate of the average hydrolysable chlorine content for the entire process for the period under reference is obtained as

$$\frac{\frac{50}{5} \times (177{\cdot}9 + 143{\cdot}2 + 180{\cdot}1 + 72{\cdot}4 + 105{\cdot}9)}{188}$$

$$= \frac{50}{5} \times \frac{679{\cdot}5}{188} = 36{\cdot}1 \text{ percent.}$$

3.4.3.1 The above method of estimating the lot mean has one drawback in the sense that it needs the knowledge of the total number of items in all the clusters of the lot. Quite often, it so happens that the number of items in the selected cluster alone is available because of the complete enumeration of the items therein. In such situations the lot mean can be estimated fairly accurately by dividing the sum of the observations of all the items in the selected clusters by the total number of items in the selected clusters.

Thus in the Example 9, if the information regarding total number of batches in all the 50 clusters in the lot is ignored, then the estimate of the lot mean is obtained as

$$\frac{177{\cdot}9 + 143{\cdot}2 + 180{\cdot}1 + 72{\cdot}4 + 105{\cdot}9}{5 + 4 + 5 + 2 + 3} = \frac{679{\cdot}5}{19} = 35{\cdot}8 \text{ percent.}$$

NOTE — If all the clusters are of the same size, the estimate of lot mean under both the situations described above is obtained by dividing the sum of all the observations in the selected clusters by the total number of items in the selected clusters (which is nothing but the product of the cluster size and number of clusters selected).

3.4.4 The estimate of the proportion of defectives in the lot may be calculated by using the formula given in **A-4.2.**

Example 10:

If in the Example 9 the minimum hydrolysable chlorine content for BHC technical is specified as 35·5 percent, then the number of defective batches in the 5 selected clusters of Example 9 are obtained as 1, 1, 0, 0 and 1 respectively.

Hence, the estimate of the proportion of defectives in the entire production during the period under reference is given by

$$\frac{\frac{50}{5}(1 + 1 + 0 + 0 + 1)}{188} = \frac{\frac{50}{5} \times 3}{188} = \frac{3}{18{\cdot}8} = 0{\cdot}16 \text{ or } 16 \text{ percent.}$$

3.4.4.1 If the information regarding the total number of items in all the clusters in the lot is not readily available, then the estimate of the proportion of defectives can be obtained by dividing the number of the defective items in all the selected clusters by the total number of items in the selected clusters.

Thus in Example 10, the estimate of the proportion of defectives in the lot as obtained by ignoring the total number of batches in the lot, is

$$\frac{1+1+0+0+1}{5+4+5+2+3} = \frac{3}{19} = 0{\cdot}16 \text{ or } 16 \text{ percent.}$$

NOTE — If all the clusters are of the same size, the estimate of the proportion of defectives in the lot under both the situations described above is obtained by dividing the number of defective items in the selected clusters by the total number of items in the selected clusters.

3.5 Two-Stage Sampling

3.5.0 When a lot submitted for inspection consists of a large number of packages each consisting of a number of items, it may not be quite economical and feasible to open each of the packages for drawing sample items (as in the case of stratified sampling described in **3.2**), or to open only a few packages and inspect all the items in these packages (as in the case of cluster sampling described in **3.4**). In such cases, it may be desirable to first select an adequate number of packages and then to choose the necessary number of items from each of these selected packages. Because of the two stages involved in this method of sampling it is referred to as two-stage sampling. The first and second stage units are also sometimes called as ' primary ' and ' ultimate ' units.

3.5.1 The method consists in selecting the items for the sample in two stages; in the first stage a desired number of primary units is selected at random and in the second stage, the required number of items are chosen at random from the selected primary units.

3.5.2 The selection of the primary units in the first stage as also the selection of items from the chosen primary units is done on the same lines as described in **3.1.2.**

Example 11:

Suppose a certain variety of cotton saris, each of 5 metre length is packed in bales and a lot consisting of 8 bales is submitted for inspection. Let the number of pieces in the 8 bales be 45, 50, 55, 43, 58, 60, 48, and 41 respectively (a total of 400 pieces in all). If it is intended to estimate the warpway breaking load of the pieces in the lot, then a two-stage random sampling method may be employed. In the first stage, if 3 out of the total of 8 bales (say second, sixth and eighth) are selected, then from the selected bales 3, 4 and 2 pieces may be chosen respectively so as to obtain a sample of size 9.

3.5.3 For the two-stage sampling, the estimate of the lot mean may be obtained by using the formula given in **A-5.1.**

Example 12:

If the breaking load (in kilograms) of the 9 selected pieces in Example 11 is obtained as

52, 51, 49 for sample pieces from the second bale

48, 53, 53, 50 for sample pieces from the sixth bale

54, 55 for sample pieces from the eighth bale

then the estimate of the mean value of the breaking load for the 3 bales are obtained as 50·7, 51·0 and 54·5 kg respectively. The estimate of the mean breaking strength of all the pieces in the lot is then obtained as

$$\frac{\frac{8}{3}(50 \times 50{\cdot}7 + 60 \times 51{\cdot}0 + 41 \times 54{\cdot}5)}{400} = \frac{8 \times 7829{\cdot}5}{3 \times 400} = 52{\cdot}2 \text{ kg.}$$

3.5.3.1 The above method of estimating the lot mean has one drawback in the sense that it needs the knowledge of the total number of items in the lot. However, it so happens frequently that the information regarding the number of items is available only for the selected primary units but not for the others unless some extra effort is put in. In such cases the lot mean may be estimated fairly accurately by suitably weighting the means of the selected primary units by their respective sizes.

Thus in the Example 12, if the information regarding number of pieces in the lot is not available, then the lot mean is estimated as

$$\frac{50 \times 50{\cdot}7 + 60 \times 51{\cdot}0 + 41 \times 54{\cdot}5}{50 + 60 + 41} = \frac{7829{\cdot}5}{151} = 51{\cdot}9 \text{ kg.}$$

NOTE — If the sampling fraction remains the same for all the selected primary units (that is, the number of items selected are proportional to the size of the primary units), then the estimate of the lot mean in this case is simply obtained by dividing the sum of all the sample observations by the total number of sample items selected.

3.5.4 The estimate of the proportion of defectives in the lot may be calculated by using the formula given in **A-5.2.**

Example 13:

If the minimum breaking load for the fabric is specified as 50 kg in Example 12, then the estimate of the proportion of defective pieces in the three selected bales are obtained as $\frac{1}{3}$, $\frac{1}{4}$ and 0 respectively.

Hence the estimate of the proportion of defectives in the lot is given by

$$\frac{\frac{8}{3}(50 \times \frac{1}{3} + 60 \times \frac{1}{4} + 41 \times 0)}{400} = \frac{8}{3} \times \frac{31{\cdot}7}{400}$$

$$= 0{\cdot}21 \text{ or } 21 \text{ percent.}$$

3.5.4.1 If the information regarding the total number of items in the lot is not readily available, then the estimate of the proportion of defectives may be obtained by suitably weighting the proportion of defectives in the selected primary units by their respective sizes.

Thus in Example 13, the estimate of the proportion of defectives in the lot as obtained by ignoring the total number of items in the lot is

$$\frac{50 \times \frac{1}{3} + 60 \times \frac{1}{4} + 41 \times 0}{50 + 60 + 41} = \frac{31{\cdot}7}{151} = 0{\cdot}21 \text{ or } 21 \text{ percent.}$$

NOTE — If the sampling fraction remains the same for all the selected primary units, then the estimate of the proportion of defectives in this case is simply obtained by dividing the number of defectives found by the total number of items sampled.

4. RANDOM NUMBERS

4.1 Appendix B contains 30 000 digits (from 0 to 9), arranged randomly on 15 pages. For convenience of reading, the digits are grouped into sets of 5 and are arranged in 40 rows and 50 columns on each page.

4.2 Selection of Random Numbers — For obtaining random numbers, any one of the 15 pages may be used. After choosing a page of random numbers, a pencil may be dropped blindly and the starting point for reading off the numbers shall be the random digit(s) nearest to the spot indicated by the pencil. The random number may then be read up or down, right or left but it may perhaps be more convenient to read them vertically downward till the bottom of the page is reached and thereafter the numbers in the adjacent column(s) to the right are read starting from the top of the page and moving downward as earlier. This systematic method of reading the numbers may be carried on to the succeeding pages if necessary.

4.2.1 If the random numbers to be chosen consist of single digit (as would be the case when lot size does not exceed 10) then the digit of any single column may be used, taking 0 to represent 10.

4.2.2 If the random numbers to be chosen consist of two digits (as would be the case when lot size does not exceed 100) then any two adjoining columns may be used, taking 00 to represent 100.

4.2.3 If the random numbers to be chosen consist of three digits (as would be the case when the lot size does not exceed 1 000) then any three adjoining columns may be used, taking 000 to represent 1 000.

4.2.4 If the random numbers to be chosen consist of four or more digits then a similar method as outlined above may be followed.

4.3 Simplifying Techniques in the Selection of Random Numbers — When a large number of random numbers are to be chosen and the total

number of items in the lot is not an integral power of 10 (such as 100, 1 000, 10 000, etc) then a simplifying technique, which is illustrated in Example 14 may be helpful.

Example 14:

Suppose the lot consists of 489 items and it is intended to select 75 items at random, one method would be to select the three-digited random numbers from 001 to 489 and choose those items corresponding to the selected numbers. But this procedure may be rather wasteful as it will result in the rejection of all three-digited random numbers which are more than 489 and less than 999, that is 510 in all. Hence, more than 50 percent of the selected numbers will have to be discarded. In order to reduce the rejection of random numbers, an alternative method would be to choose the three-digited random numbers, divide them by a convenient round figure larger than the lot size, say 500, and then choose the items corresponding to the remainder obtained. This procedure will result in the rejection of very few numbers — those above 489 and below 500 and again those above 989 and below 999 (which give remainders greater than 489 when divided by 500), thereby leading to the rejection of only 22 numbers as compared to 510 by the earlier procedure.

APPENDIX A

(*Clauses* 3.1.3, 3.1.4, 3.2.3, 3.2.4, 3.3.2, 3.4.3, 3.4.4, 3.5.3 *and* 3.5.4)

FORMULAE FOR THE ESTIMATION OF LOT AVERAGE AND LOT PROPORTION OF DEFECTIVES

A-0. For the different sampling methods covered in the standard formulae for the estimation of lot average (when the sample data is of the quantitative type) and the lot proportion of defectives (when the sample data is of the qualitative type) are given in **A-1** to **A-5.**

A-1. SIMPLE RANDOM SAMPLING

A-1.1 If $x_1, x_2, \ldots\ldots\ldots\ldots x_n$ are the test results or observations corresponding to the n sample items selected from the lot of size N by the simple random sampling without replacement then the sample average ($\bar{x}$) is calculated as

$$\sum_{i=1}^{n} \frac{x_i}{n} = \frac{x_1 + x_2 + \ldots\ldots\ldots x_n}{n}$$

$\bar{x}$ is also an estimate of the average (or mean) quality for the lot.

A-1.2 If out of the n sample items selected from a lot of size N, a total of d defectives are observed, then proportion of defectives (p) in the sample is calculated as $\frac{d}{n}$.

p is also an estimate of the proportion of defectives in the lot.

A-2. STRATIFIED SAMPLING

A-2.1 Suppose a lot of size N consist of k strata comprising of $N_1, N_2, \ldots\ldots$ N_k items so that $N_1 + N_2 + \ldots\ldots + N_k = N$.

Let $n_1, n_2, \ldots\ldots n_k$ items be selected from k strata by the stratified random sampling method so as to obtain sample of size n ($= n_1 + n_2 + \ldots\ldots + n_k$).

If the test results or observations corresponding to the sample of size n are

$x_{11}, x_{12}, \ldots\ldots x_{1n_1}$ for the n_1 items from the first stratum,

$x_{21}, x_{22}, \ldots\ldots x_{2n_2}$ for the n_2 items from the second stratum,

$\ldots\ldots$

$\ldots\ldots$

$x_{k1}, x_{k2}, \ldots\ldots x_{kn_k}$ for the n_k items from the kth stratum

then the average for the various strata are calculated as $\bar{x}_1, \bar{x}_2, \ldots\ldots \bar{x}_k$.

The estimate of the lot average quality is then obtained as

$$\frac{N_1 \bar{x}_1 + N_2 \bar{x}_2 + \ldots\ldots + N_k \bar{x}_k}{N}$$

If the sampling fraction is same for all the strata, that is

$$\frac{n_1}{N_1} = \frac{n_2}{N_2} \ldots\ldots = \frac{n_k}{N_k} = t, \text{ say}$$

then the estimate of the lot average quality is simply obtained as

$$\frac{x_{11} + \ldots\ldots + x_{kn_k}}{tN} = \frac{x_{11} + \ldots\ldots + x_{kn_k}}{n}$$

A-2.2 If the number of defectives found in the samples from the k strata are $d_1, d_2, \ldots\ldots d_k$ then the estimates of proportion of defectives in the various strata are calculated as

$$p_1 \left(= \frac{d_1}{n_1}\right), p_2 \left(= \frac{d_2}{n_2}\right), \ldots\ldots p_k \left(= \frac{d_k}{n_k}\right)$$

The estimate of the proportion of defectives in the lot is calculated as

$$\frac{N_1 p_1 + N_2 p_2 + \ldots\ldots + N_k p_k}{N}$$

If the sampling fraction is same (say t) for all the strata, then the estimate of proportion of defectives in the lot is obtained as

$$\frac{d_1 + d_2 + \ldots\ldots\ldots d_k}{tN} = \frac{d_1 + d_2 + \ldots\ldots\ldots d_k}{n}$$

A-3. SYSTEMATIC SAMPLING

A-3.1 If $x_1, x_2, \ldots\ldots\ldots x_n$ are the test results or observations corresponding to the n items selected from a lot of size N by the systematic sampling method, then the sample average ($\bar{x}$) is calculated as

$$\bar{x} = \frac{x_1 + x_2 + \ldots\ldots\ldots + x_n}{n}$$

$\bar{x}$ is also an estimate of the average quality characteristic for the lot.

A-3.2 If out of n sample items selected from a lot of size N, a total of d defectives are observed, then the proportion of defectives (p) in the sample is calculated as $\frac{d}{n}$.

p is also an estimate of the proportion of defectives in the lot.

A-4. CLUSTER SAMPLING

A-4.1 Let a lot consist of k clusters of sizes $N_1, N_2, \ldots\ldots\ldots N_k$ so that $N_1 + N_2 + \ldots\ldots\ldots N_k = N$.

Suppose r clusters out of the k clusters in the lot are selected so that the total number of items in the r selected clusters is n. If the test results or observations corresponding to the jth selected cluster of size N_j are given by $x_{j1}, x_{j2}, \ldots\ldots x_{jN_j}$, the sample mean for the jth cluster is calculated as

$$\bar{x}_j = \frac{x_{j1} + x_{j2} + \ldots\ldots\ldots + x_{jN_j}}{N_j}$$

The estimate of the lot mean quality is then obtained as $\frac{k}{r} \frac{\sum_{}^{r} N_j \bar{x}_j}{N}$.

A-4.1.1 If the information about the total number of clusters in the lot (k) or the lot size (N) is not available, then the estimate of the lot mean quality may be obtained as

$$\frac{\sum_{}^{r} N_j \bar{x}_j}{\sum_{}^{r} N_j} = \frac{\sum_{}^{r} N_j \bar{x}_j}{n}$$

A-4.2 If the jth selected cluster has d_j defectives, then the proportion of defectives in the jth cluster is given by

$$p_j \left(= \frac{d_j}{N_j} \right)$$

The estimate of the proportion of defectives in the lot is then calculated as

$$\frac{k}{r} \frac{\sum_{}^{r} N_j p_j}{N} = \frac{k}{r} \frac{\sum_{}^{r} d_j}{N}$$

A-4.2.1 If the information about the total number of clusters in the lot (k) or the lot size (N) is not available, then the estimate of the proportion of defectives in the lot may be obtained as

$$\frac{\sum_{}^{r} N_j p_j}{\sum_{}^{r} N_j} = \frac{\sum_{}^{r} d_j}{n}$$

NOTE — If all the clusters are of the same size, we have

$$N_1 = N_2 = \ldots\ldots\ldots\ldots = N_k = \frac{N}{k}$$

Then the estimate of the lot average quality is simply obtained as

$$\frac{\sum_{}^{r} \bar{x}_j}{r}$$

Also the estimate of the proportion of defectives in the lot reduces to

$$\frac{\sum_{}^{r} p_j}{r} = \frac{\sum_{}^{r} d_j}{n}$$

A-5. TWO-STAGE SAMPLING

A-5.1 Let a lot consist of k primary units which in turn comprise of N_1, N_2, $\ldots\ldots\ldots\ldots N_k$ items so that $N_1 + N_2 + \ldots\ldots\ldots\ldots + N_k = N$.

Suppose r primary units are selected from the lot at random and from each of these r primary units suitable number of items are chosen so that the total number of items obtained is n.

If from the jth primary unit selected, n_j items are chosen and the test results or observations corresponding to these n_j items are given by x_{j1}, x_{j2}, $\ldots\ldots\ldots\ldots x_{jn_j}$ then the sample average for the jth primary unit is given by

$$\bar{x}_j = \frac{x_{j1} + x_{j2} + \ldots\ldots\ldots\ldots + x_{jn_j}}{n_j}$$

The estimate of the lot average quality is then calculated as

$$\frac{k}{r} \frac{\sum^{r} N_j \bar{x}_j}{N}$$

A-5.1.1 If the information on the total number of primary units in the lot (k) or the total number of items in the lot (N) is not available, then the estimate of the lot mean may be obtained as

$$\frac{\sum^{r} N_j \bar{x}_j}{\sum^{r} N_j}$$

A-5.2 If the n_j second-stage units selected from the jth primary unit contain d_j defectives, the proportion of defectives in the jth primary unit is obtained as

$$p_j \left[= \frac{d_j}{n_j} \right]$$

The estimate of the proportion of defectives in the lot is then taken as

$$\frac{k}{r} \frac{\sum^{r} N_j p_j}{N}$$

A-5.2.1 If the information regarding the total number of primary units (k) in the lot or the lot size (N) is not available, then the estimate of the proportion of defectives in the lot may be obtained as

$$\frac{\sum^{r} N_j p_j}{\sum^{r} N_j}$$

NOTE — If the sampling fraction is the same for all the r primary units selected, then the estimate of the lot mean quality as obtained from **A-5.1.1** is

$$\frac{\sum^{r} n_j \bar{x}_j}{\sum^{r} n_j} = \frac{\sum^{r} n_j \bar{x}_j}{n}$$

Similarly, the estimate of the proportion of defective as obtained from **A-5.2.1** is

$$\frac{\sum^{r} n_j p_j}{\sum^{r} n_j} = \frac{\sum^{r} n_j p_j}{n} = \frac{\sum^{r} d_j}{n}$$

APPENDIX B

(*Clause* 4.1)

TABLE OF RANDOM NUMBERS

Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
1	10 097	32 533	76 520	13 586	34 673	54 876	80 959	09 117	39 292	74 945
2	37 542	04 805	64 894	74 296	24 805	24 037	20 636	10 402	00 822	91 665
3	08 422	68 953	19 645	09 303	23 209	02 560	15 953	34 764	35 080	33 606
4	99 019	02 529	09 376	70 715	38 311	31 165	88 676	74 397	04 436	27 659
5	12 807	99 970	80 157	36 147	64 032	36 653	98 951	16 877	12 171	76 833
6	66 065	74 717	34 072	76 850	36 697	36 170	65 813	39 885	11 199	29 170
7	31 060	10 805	45 571	82 406	35 303	42 614	86 799	07 439	23 403	09 732
8	85 269	77 602	02 051	65 692	68 665	74 818	73 053	85 247	18 623	88 579
9	63 573	32 135	05 325	47 048	90 553	57 548	28 468	28 709	83 491	25 624
10	73 796	45 753	03 529	64 778	35 808	34 282	60 935	20 344	35 273	88 435
11	98 520	17 767	14 905	68 607	22 109	40 558	60 970	93 433	50 500	73 998
12	11 805	05 431	39 808	27 732	50 725	68 248	29 405	24 201	52 775	67 851
13	83 452	99 634	06 288	98 083	13 746	70 078	18 475	40 610	68 711	77 817
14	88 685	40 200	86 507	58 401	36 766	67 951	90 364	76 493	29 609	11 062
15	99 594	67 348	87 517	64 969	91 826	08 928	93 785	61 368	23 478	34 113
16	65 481	17 674	17 468	50 950	58 047	76 974	73 039	57 186	40 218	16 544
17	80 124	35 635	17 727	08 015	45 318	22 374	21 115	78 253	14 385	53 763
18	74 350	99 817	77 402	77 214	43 236	00 210	45 521	64 237	96 286	02 655
19	69 916	26 803	66 252	29 148	36 936	87 203	76 621	13 990	94 400	56 418
20	09 893	20 505	14 225	68 514	46 427	56 788	96 297	78 822	54 382	14 598
21	91 499	14 523	68 479	27 686	46 162	83 554	94 750	89 923	37 089	20 048
22	80 336	94 598	26 940	36 858	70 297	34 135	53 140	33 340	42 050	82 341
23	44 104	81 949	85 157	47 954	32 979	26 575	57 600	40 881	22 222	06 413
24	12 550	73 742	11 100	02 040	12 860	74 697	96 644	89 439	28 707	25 815
25	63 606	49 329	16 505	34 484	40 219	52 563	43 651	77 082	07 207	31 790
26	61 196	90 446	26 457	47 774	51 924	33 729	65 394	59 593	42 582	60 527
27	15 474	45 266	95 270	79 953	59 367	83 848	82 396	10 118	33 211	59 466
28	94 557	28 573	67 897	54 387	54 622	44 431	91 190	42 592	92 927	45 973
29	42 481	16 213	97 344	08 721	16 868	48 767	03 071	12 059	25 701	46 670
30	23 523	78 317	73 208	89 837	68 935	91 416	26 252	29 663	05 522	82 562
31	04 493	52 494	75 246	33 824	45 862	51 025	61 962	79 335	65 337	12 472
32	00 549	97 654	64 051	88 159	96 119	63 896	54 692	82 391	23 287	29 529
33	35 963	15 307	26 898	09 354	33 351	35 462	77 974	50 024	90 103	39 333
34	59 808	08 391	45 427	26 842	83 609	49 700	13 021	24 892	78 565	20 106
35	46 058	85 236	01 390	92 286	77 281	44 077	93 910	83 647	70 617	42 941
36	32 179	00 597	87 379	25 241	05 567	07 007	86 743	17 157	85 394	11 838
37	69 234	61 406	20 117	45 204	15 956	60 000	18 743	92 423	97 118	96 338
38	19 565	41 430	01 758	75 379	40 419	21 585	66 674	36 806	84 962	85 207
39	45 155	14 938	19 476	07 246	43 667	94 543	59 047	90 033	20 826	69 541
40	94 864	31 994	36 168	10 851	34 888	81 553	01 540	35 456	05 014	51 176

(*Continued*)

Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
41	98 086	24 826	45 240	28 404	44 999	08 896	39 094	73 407	35 441	31 880
42	33 185	16 232	41 941	50 949	89 435	48 581	88 695	41 994	37 548	73 043
43	80 951	00 406	96 382	70 774	20 151	23 387	25 016	25 298	94 624	61 171
44	79 752	49 140	71 961	28 296	69 861	02 591	74 852	20 539	00 387	59 579
45	18 633	32 537	98 145	06 571	31 010	24 674	05 455	61 427	77 938	91 936
46	74 029	43 902	77 557	32 270	97 790	17 119	52 527	58 021	80 814	51 748
47	54 178	45 611	80 993	37 143	05 335	12 969	56 127	19 255	36 040	90 324
48	11 664	49 883	52 079	84 827	59 381	71 539	09 973	33 440	88 461	23 356
49	48 324	77 928	31 249	64 710	02 295	36 870	32 307	57 546	15 020	09 994
50	69 074	94 138	87 637	91 976	35 584	04 401	10 518	21 615	01 848	76 938
51	09 188	20 097	32 825	39 527	04 220	86 304	83 389	87 374	64 278	58 044
52	90 045	85 497	51 981	50 654	94 938	81 997	91 870	76 150	68 476	64 659
53	73 189	50 207	47 677	26 269	62 290	64 464	27 124	67 018	41 361	82 760
54	75 768	76 490	20 971	87 749	90 429	12 272	95 375	05 871	93 823	43 178
55	54 016	44 056	66 281	31 003	00 682	27 398	20 714	53 295	07 706	17 813
56	08 358	69 910	78 542	42 785	13 661	58 873	04 618	97 553	31 223	08 420
57	28 306	03 264	81 333	10 591	40 510	07 893	32 604	60 475	94 119	01 840
58	53 840	86 233	81 594	13 628	51 215	90 290	28 466	68 795	77 762	20 791
59	91 757	53 741	61 613	62 269	50 263	90 212	55 781	76 514	83 483	47 055
60	89 415	92 694	00 397	58 391	12 607	17 646	48 949	72 306	94 541	37 408
61	77 513	03 820	86 864	29 901	68 414	82 774	51 908	13 980	72 893	55 507
62	19 502	37 174	69 979	20 288	55 210	29 773	74 287	75 251	65 344	67 415
63	21 818	59 313	93 278	81 757	05 686	73 156	07 082	85 046	31 853	38 452
64	51 474	66 499	68 107	23 621	94 049	91 345	42 836	09 191	08 007	45 449
65	99 559	68 331	62 535	24 170	69 777	12 830	74 819	78 142	43 860	72 834
66	33 713	48 007	93 584	72 869	51 926	64 721	58 303	29 822	93 174	93 972
67	85 274	86 893	11 303	22 970	28 834	34 137	73 515	90 400	71 148	43 643
68	84 133	89 640	44 035	52 166	73 852	70 091	61 222	60 561	62 327	18 423
69	56 732	16 234	17 395	96 131	10 123	91 622	85 496	57 560	81 604	18 880
70	65 138	56 806	87 648	85 261	34 313	65 861	45 875	21 069	85 644	47 277
71	38 001	02 176	81 719	11 711	71 602	92 937	74 219	64 049	65 584	49 698
72	37 402	96 397	01 304	77 586	56 271	10 086	47 324	62 605	40 030	37 438
73	97 125	40 348	87 083	31 417	21 815	39 250	75 237	62 047	15 501	29 578
74	21 826	41 134	47 143	34 072	64 638	85 902	49 139	06 441	03 856	54 552
75	73 135	42 742	95 719	09 035	85 794	74 296	08 789	88 156	64 691	19 202
76	07 638	77 929	03 061	18 072	96 207	44 156	23 821	99 538	04 713	66 994
77	60 528	83 441	07 954	19 814	59 175	20 695	05 533	52 139	61 212	06 455
78	83 596	35 655	06 958	92 983	05 128	09 719	77 433	53 783	92 301	50 498
79	10 850	62 746	99 599	10 507	13 499	06 319	53 075	71 839	06 410	19 362
80	39 820	98 952	43 622	63 147	64 421	80 814	43 800	09 351	31 024	73 167

(*Continued*)

Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
81	59 580	06 478	75 569	78 800	88 835	54 486	23 768	06 156	04 111	08 408
82	38 508	07 341	23 793	48 763	90 822	97 022	17 719	04 207	95 954	49 953
83	30 692	70 668	94 688	16 127	56 196	80 091	82 067	63 400	05 462	69 200
84	65 443	95 659	18 288	27 437	49 632	24 041	08 337	65 676	96 299	90 836
85	27 267	50 264	13 192	72 294	07 477	44 606	17 985	48 911	97 341	30 358
86	91 307	06 991	19 072	24 210	36 699	53 728	28 825	35 793	28 976	66 252
87	68 434	94 688	84 473	13 622	62 126	98 408	12 843	82 590	09 815	93 146
88	48 908	15 877	54 745	24 591	35 700	04 754	83 824	52 692	54 130	55 160
89	06 913	45 197	42 672	78 601	11 883	09 528	63 011	98 901	14 974	40 344
90	10 455	16 019	14 210	33 712	91 342	37 821	88 325	80 851	43 667	70 883
91	12 883	97 343	65 027	61 184	04 285	01 392	17 974	15 077	90 712	26 769
92	21 778	30 976	38 807	36 961	31 649	42 096	63 281	02 023	08 816	47 449
93	19 523	59 515	65 122	59 659	86 283	68 258	69 572	13 798	16 435	91 529
94	67 245	52 670	35 583	16 563	79 246	86 686	76 463	34 222	26 655	90 802
95	60 584	47 377	07 500	37 992	45 134	26 529	26 760	83 637	41 326	44 344
96	53 853	41 377	36 066	94 850	58 838	73 859	49 364	73 331	96 240	43 642
97	24 637	38 736	74 384	89 342	52 623	07 992	12 369	18 601	03 742	83 873
98	83 080	12 451	38 992	22 815	07 759	51 777	97 377	27 585	51 972	37 867
99	16 444	24 334	36 151	99 073	27 493	70 939	85 130	32 552	54 846	54 759
100	60 790	18 157	57 178	65 762	11 161	78 576	45 819	52 979	65 130	04 869
101	03 991	10 461	93 716	16 894	66 083	24 653	84 609	58 232	88 618	19 161
102	38 555	95 554	32 886	59 780	08 355	60 860	29 735	47 762	71 299	23 853
103	17 546	73 704	92 052	46 215	55 121	29 281	59 076	07 936	27 954	58 909
104	32 643	52 861	95 819	06 831	00 911	93 936	76 355	93 779	80 863	00 514
105	69 572	68 777	39 510	35 905	14 060	40 619	29 549	69 616	33 564	60 780
106	24 122	66 591	27 699	06 494	14 845	46 672	61 958	77 100	90 899	75 754
107	61 196	30 231	92 962	61 773	41 839	55 382	17 267	70 943	78 033	70 267
108	30 532	21 704	10 274	12 202	39 685	23 309	10 061	68 829	55 936	66 485
109	03 788	97 599	75 867	20 717	74 416	53 166	35 203	33 374	87 539	03 823
110	48 228	63 379	85 783	47 619	53 152	67 433	35 663	52 972	16 818	60 311
111	60 365	94 653	35 075	33 949	42 614	29 297	01 918	28 316	98 953	73 231
112	83 799	42 402	56 623	34 442	34 994	41 374	70 071	14 736	09 958	18 065
113	32 960	07 405	36 409	83 232	99 385	41 600	11 133	07 586	15 917	06 253
114	19 322	53 845	57 620	52 606	66 497	68 646	78 138	66 559	19 610	99 413
115	11 220	94 747	07 399	37 408	48 509	23 929	27 482	45 476	85 244	35 159
116	31 751	57 260	68 980	05 339	15 470	48 355	88 651	22 596	03 152	19 121
117	88 492	99 382	14 454	04 504	20 094	98 977	74 843	93 413	22 109	78 508
118	30 934	47 744	07 481	83 828	73 788	06 533	28 597	20 405	94 205	20 380
119	22 888	48 893	27 499	98 748	60 530	45 128	74 022	84 617	82 037	10 263
120	78 212	16 993	35 902	91 386	44 372	15 486	65 741	14 014	87 481	37 220

(*Continued*)

Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
121	41 849	84 547	46 850	52 326	34 677	58 300	74 910	64 345	19 325	81 549
122	46 352	33 049	69 248	93 460	45 305	07 521	61 318	31 855	14 413	70 951
123	11 087	96 294	14 013	31 792	59 747	67 277	76 503	34 513	39 663	77 544
124	52 701	08 337	56 303	87 315	16 520	69 676	11 654	99 893	02 181	68 161
125	57 275	36 898	81 304	48 585	68 652	27 376	92 852	55 866	88 448	03 584
126	20 857	73 156	70 284	24 326	79 375	95 220	01 159	63 267	10 622	48 391
127	15 633	84 924	90 415	93 614	33 521	26 665	55 823	47 641	86 225	31 704
128	92 694	48 297	39 904	02 115	59 589	49 067	66 821	41 575	49 767	04 037
129	77 613	19 019	88 152	00 080	20 554	91 409	96 277	48 257	50 816	97 616
130	38 688	32 486	45 134	63 545	59 404	72 059	43 947	51 680	43 852	59 693
131	25 163	01 889	70 014	15 021	41 290	67 312	71 857	15 957	68 971	11 403
132	65 251	07 629	37 239	33 295	05 870	01 119	92 784	26 340	18 477	65 622
133	36 815	43 625	18 637	37 509	82 444	99 005	04 921	73 701	14 707	93 997
134	64 397	11 692	05 327	82 162	20 247	81 759	45 197	25 332	83 745	22 567
135	04 515	25 624	95 096	67 946	48 460	85 558	15 191	18 782	16 930	33 361
136	83 761	60 873	43 253	84 145	60 833	25 983	01 291	41 349	20 368	07 126
137	14 387	06 345	80 854	09 279	43 529	06 318	38 384	74 761	41 196	37 480
138	51 321	92 246	80 088	77 074	88 722	56 736	66 164	49 431	66 919	31 678
139	72 472	00 008	80 890	18 002	94 813	31 900	54 155	83 436	35 352	54 131
140	05 466	55 306	93 128	18 .64	74 457	90 561	72 848	11 834	79 982	68 416
141	39 528	72 484	82 474	25 593	48 545	35 247	18 619	13 674	18 611	19 241
142	81 616	18 711	53 342	44 276	75 122	11 724	74 627	73 707	58 319	15 997
143	07 586	16 120	82 641	22 820	92 904	13 141	32 392	19 763	61 199	67 940
144	90 767	04 235	13 574	17 200	69 902	63 742	78 464	22 501	18 627	90 872
145	40 188	28 193	29 593	88 627	94 972	11 598	62 095	36 787	00 441	58 997
146	34 414	82 157	86 887	55 087	19 152	00 023	12 302	80 783	32 624	68 691
147	63 439	75 363	44 989	16 622	36 024	00 867	76 378	41 605	65 961	73 488
148	67 049	09 070	93 399	45 547	94 458	74 284	05 041	49 807	20 288	34 060
149	79 495	04 146	52 162	90 286	54 158	34 243	46 978	35 482	59 362	95 938
150	91 704	30 552	04 737	21 031	75 051	93 029	47 665	64 382	99 782	93 478
151	94 015	46 874	32 444	48 277	59 820	96 163	64 654	25 843	41 145	42 820
152	74 108	88 222	88 570	74 015	25 704	91 035	01 755	14 750	48 968	38 603
153	62 880	87 873	95 160	59 221	22 304	90 314	72 877	17 334	39 283	04 149
154	11 748	12 102	80 580	41 867	17 710	59 621	06 554	07 850	73 950	79 552
155	17 944	05 600	60 478	03 343	25 852	58 905	57 216	39 618	49 856	99 326
156	66 067	42 792	95 043	52 680	46 780	56 487	09 971	59 481	37 006	22 186
157	54 244	91 030	45 547	70 818	59 849	96 169	61 459	21 647	87 417	17 198
158	30 945	57 589	31 732	57 260	47 670	07 654	46 376	25 366	94 746	49 580
159	69 170	37 403	86 995	90 307	94 304	71 803	26 825	05 511	12 459	91 314
160	08 345	88 975	35 841	85 771	08 105	59 987	87 112	21 476	14 713	71 181

(*Continued*)

Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
161	27 767	43 584	85 301	88 977	29 490	69 714	73 035	41 207	74 699	09 310
162	13 025	14 338	54 066	15 243	47 724	66 733	47 431	43 905	31 048	56 699
163	80 217	36 292	98 525	24 335	24 432	24 896	43 277	58 874	11 466	16 082
164	10 875	62 004	90 391	61 105	57 411	06 368	53 856	30 743	03 670	84 741
165	54 127	57 326	26 629	19 087	24 472	88 779	30 540	27 886	61 732	75 454
166	60 311	42 824	37 301	42 678	45 990	43 242	17 374	52 003	70 707	70 214
167	49 739	71 484	92 003	98 086	76 668	73 209	59 202	11 973	02 902	33 250
168	78 626	51 594	16 453	94 614	39 014	97 066	83 012	09 832	25 571	77 628
169	66 692	13 986	99 837	00 582	81 232	44 987	09 504	96 412	90 193	79 568
170	44 071	28 091	07 362	97 703	76 447	42 537	98 524	97 831	65 704	09 514
171	41 468	85 149	49 554	17 994	14 924	39 650	95 294	00 556	70 431	06 905
172	94 559	37 559	49 678	53 119	70 312	05 682	66 986	34 099	74 474	20 740
173	41 615	70 360	64 114	58 660	90 850	64 618	80 620	51 790	11 436	38 072
174	50 273	93 113	41 794	86 861	24 781	89 683	55 411	85 667	77 535	99 892
175	41 396	80 504	90 670	08 289	40 902	05 069	95 083	06 783	28 102	57 816
176	25 807	24 260	71 529	78 920	72 682	07 385	90 726	57 166	98 884	03 583
177	06 170	97 965	88 302	98 041	21 443	41 808	69 984	83 620	89 747	93 882
178	60 808	54 444	74 412	81 105	01 176	28 838	36 421	16 489	18 059	51 061
179	80 940	44 893	10 408	36 222	80 582	71 944	92 633	40 333	67 054	16 067
180	19 516	90 120	46 759	71 643	13 177	55 292	21 036	82 808	77 501	97 427
181	49 386	54 480	23 604	23 554	21 785	41 101	91 178	10 174	29 420	90 433
182	06 312	88 940	15 995	69 321	47 458	64 809	98 189	81 851	29 651	84 215
183	60 942	00 307	11 897	92 674	40 405	63 032	96 717	54 244	10 701	41 393
184	92 329	98 932	78 284	46 347	71 209	92 061	39 448	93 136	25 722	08 564
185	77 936	63 574	31 384	51 924	85 561	29 671	58 137	17 820	22 751	36 518
186	38 101	77 756	11 657	13 897	95 889	57 067	47 648	13 885	70 669	93 406
187	39 641	69 457	91 339	22 502	92 613	89 719	11 947	56 203	19 324	20 504
188	84 054	40 455	99 396	63 680	67 667	60 631	69 181	96 845	38 525	11 600
189	47 468	03 577	57 649	63 266	24 700	71 594	14 004	23 153	69 249	05 747
190	43 321	31 370	28 977	23 896	76 479	68 562	62 342	07 589	08 899	05 985
191	64 281	61 826	18 555	64 937	13 173	33 365	78 851	16 499	87 064	13 075
192	66 847	70 495	32 350	02 985	86 716	38 746	26 313	77 463	55 387	72 691
193	72 461	33 230	21 529	53 424	92 581	02 262	78 438	66 276	18 396	73 538
194	21 032	91 050	13 058	16 218	12 470	56 500	15 292	76 139	59 526	52 113
195	95 362	67 011	06 651	16 136	01 016	00 857	55 018	56 374	35 824	71 703
196	49 712	97 380	10 404	55 452	34 030	60 726	75 211	10 271	36 633	68 424
197	58 275	61 764	97 586	54 716	50 259	46 345	87 195	46 092	26 787	60 939
198	89 514	11 788	68 224	23 417	73 959	76 145	30 342	40 277	11 049	72 049
199	15 472	50 669	48 139	36 732	46 874	37 088	73 465	09 819	58 869	35 220
200	12 120	86 124	51 247	44 302	60 883	52 109	21 437	36 786	49 226	77 837

(*Continued*)

Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
201	19 612	78 430	11 661	94 770	77 603	65 669	86 868	12 665	30 012	75 989
202	39 141	77 400	28 000	64 238	73 258	71 794	31 340	26 256	66 453	37 016
203	64 756	80 457	08 747	12 836	03 469	50 678	03 274	43 423	66 677	82 556
204	92 901	51 878	56 441	22 998	29 718	38 447	06 453	25 311	07 565	53 771
205	03 551	90 070	09 483	94 050	45 938	18 135	36 908	43 321	11 073	51 803
206	98 884	66 209	06 830	53 656	14 663	56 346	71 430	04 909	19 818	05 707
207	27 369	86 882	53 473	07 541	53 633	70 863	03 748	12 822	19 360	49 088
208	59 066	75 974	63 335	20 483	43 514	37 481	58 278	26 967	49 325	43 951
209	91 647	93 783	64 169	49 022	98 588	09 495	49 829	59 068	38 831	04 838
210	83 605	92 419	39 542	07 772	71 568	75 673	35 185	89 759	44 901	74 291
211	24 895	88 530	70 774	35 439	46 758	70 472	70 207	92 675	91 623	61 275
212	35 720	26 556	95 596	20 094	73 750	85 788	34 264	01 703	46 833	65 248
213	14 141	53 410	38 649	06 343	57 256	61 342	72 709	75 318	90 379	37 562
214	27 416	75 670	92 176	72 535	93 119	56 077	06 886	18 244	92 344	31 374
215	82 071	07 429	81 007	47 749	40 744	56 974	23 336	88 821	53 841	10 536
216	21 445	82 793	24 831	93 241	14 199	76 268	70 883	68 002	03 829	17 443
217	72 513	76 400	52 225	92 348	62 308	98 481	29 744	33 165	33 141	61 020
218	71 479	45 027	76 160	57 411	13 780	13 632	52 308	77 762	88 874	33 697
219	83 210	51 466	09 088	50 395	26 743	05 306	21 706	70 001	99 439	80 767
220	68 749	95 148	94 897	78 636	96 750	09 024	94 538	91 143	96 693	61 886
221	05 184	75 763	47 075	88 158	05 313	53 439	14 908	08 830	60 096	21 551
222	13 651	62 546	96 892	25 240	47 511	58 483	87 342	78 818	07 855	39 269
223	00 566	21 220	00 292	24 069	25 072	29 519	52 548	54 091	21 282	21 296
224	50 958	17 695	58 072	68 990	60 329	95 955	71 586	63 417	35 947	67 807
225	57 621	64 547	46 850	37 981	38 527	09 037	64 756	03 324	04 986	83 666
226	09 282	25 844	79 139	78 435	35 428	43 561	69 799	63 314	12 991	93 516
227	23 394	94 206	93 432	37 836	94 919	26 846	02 555	74 410	94 915	48 199
228	05 280	37 470	93 622	04 345	15 092	19 510	18 094	16 613	78 234	50 001
229	95 491	97 976	38 306	32 192	82 639	54 624	72 434	92 606	23 191	74 693
230	78 521	00 104	18 248	75 583	90 326	50 785	54 034	66 251	35 774	14 692
231	96 345	44 579	85 932	44 053	75 704	20 840	86 583	83 944	52 456	73 766
232	77 963	31 151	32 364	91 691	47 357	40 338	23 435	24 065	08 458	95 366
233	07 520	11 294	23 238	01 748	41 690	67 328	54 814	37 777	10 057	42 332
234	38 423	02 309	70 703	85 736	46 148	14 258	29 236	12 152	05 088	65 825
235	02 463	65 533	21 199	60 555	33 928	01 817	07 396	89 215	30 722	22 102
236	15 880	92 261	17 292	88 190	61 781	48 898	92 525	21 283	88 581	60 098
237	71 926	00 819	59 144	00 224	30 570	90 194	18 329	06 999	26 857	19 238
238	64 425	28 108	16 554	16 016	00 042	83 229	10 333	36 168	65 617	94 834
239	79 782	23 924	49 440	30 432	81 077	31 543	95 216	64 865	13 658	51 081
240	35 337	74 538	44 553	64 672	90 960	41 849	93 865	44 608	93 176	34 851

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Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
241	05 249	29 329	19 715	94 082	14 738	86 667	43 708	66 354	93 692	25 527
242	56 463	99 380	38 793	85 774	19 056	13 939	46 062	27 647	66 146	63 210
243	96 296	33 121	54 196	34 108	75 814	85 986	71 171	15 102	28 992	63 165
244	98 380	36 269	60 014	07 201	62 448	46 385	42 175	88 350	49 182	49 126
245	52 567	64 350	16 315	53 969	80 395	81 114	54 358	64 578	47 269	15 747
246	78 498	90 830	25 955	99 236	43 286	91 064	99 969	95 144	64 424	77 377
247	49 553	24 241	08 150	89 535	08 703	91 041	77 323	81 079	45 127	93 686
248	32 151	07 075	83 155	10 252	73 100	88 618	23 891	87 418	45 417	20 268
249	11 314	50 363	26 860	27 799	49 416	83 534	19 187	08 059	76 677	02 110
250	12 364	71 210	87 052	50 241	90 785	97 889	81 399	58 130	64 439	05 614
251	59 467	58 309	87 834	57 213	37 510	33 689	01 259	62 486	56 320	46 265
252	73 452	17 619	56 421	40 725	23 439	41 701	93 223	41 682	45 026	47 505
253	27 635	56 293	91 700	04 391	67 317	89 604	73 020	69 853	61 517	51 207
254	86 040	02 596	01 655	09 918	45 161	00 222	54 577	74 821	47 335	08 582
255	52 403	94 255	26 351	46 527	68 224	90 183	85 057	72 310	34 963	83 462
256	49 465	46 581	61 499	04 844	94 626	02 963	41 482	83 879	44 942	63 915
257	94 365	92 560	12 363	30 246	02 086	75 036	88 620	91 088	67 691	67 762
258	34 261	08 769	91 830	23 313	18 256	28 850	37 639	92 748	57 791	71 328
259	37 110	66 538	39 318	15 626	44 324	82 827	08 782	65 960	58 167	01 305
260	83 950	45 424	72 453	19 444	68 219	64 733	94 088	62 006	89 985	36 936
261	61 630	97 966	76 537	46 467	30 942	07 479	67 971	14 558	22 458	35 148
262	01 929	17 165	12 037	74 558	16 250	71 750	55 546	29 693	94 984	37 782
263	41 659	39 098	23 982	29 899	71 594	77 979	54 477	13 764	17 315	72 893
264	32 031	39 608	75 992	73 445	01 317	50 525	87 313	45 191	30 214	19 769
265	90 043	93 478	58 044	06 949	31 176	88 370	50 274	83 987	45 316	38 551
266	79 418	14 322	91 065	07 841	36 130	86 602	10 659	40 859	00 964	71 577
267	85 447	61 079	96 910	72 906	07 361	84 338	34 114	52 096	66 715	51 091
268	86 219	81 115	49 625	48 799	89 485	24 855	13 684	68 433	70 595	70 102
269	71 712	88 559	92 476	32 903	68 009	58 417	87 962	11 787	16 644	72 964
270	29 776	63 075	13 270	84 758	49 560	10 317	28 778	23 006	31 036	84 906
271	81 488	17 340	74 154	42 801	27 917	89 792	62 604	62 234	13 124	76 471
272	51 667	37 589	87 147	24 743	48 023	06 325	79 794	35 889	13 255	04 925
273	99 004	70 322	60 832	76 636	56 907	56 534	72 615	46 288	36 788	93 196
274	68 656	66 492	35 933	52 293	47 953	95 495	95 304	50 009	83 464	28 608
275	38 074	74 083	09 337	07 965	65 047	36 871	59 015	21 769	30 398	44 855
276	01 020	80 680	59 328	08 712	48 190	45 332	27 284	31 287	66 011	09 376
277	86 379	74 508	33 579	77 114	92 955	23 085	92 824	03 054	25 242	16 322
278	48 498	09 938	44 420	13 484	52 319	58 875	02 012	88 591	52 500	95 795
279	41 800	95 363	54 142	17 482	32 705	60 564	12 505	40 954	46 174	64 130
280	63 026	96 712	79 883	39 225	52 653	69 549	36 693	59 822	22 684	31 661

(*Continued*)

Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
281	88 298	15 489	16 030	42 480	15 372	38 781	71 995	77 438	91 161	10 192
282	07 839	62 735	99 218	25 624	02 547	27 445	69 187	55 749	32 322	15 504
283	73 298	51 108	48 717	92 926	75 705	89 787	96 114	99 902	37 749	96 305
284	12 829	70 474	00 838	50 385	91 711	80 370	56 504	56 857	80 906	09 018
285	76 569	61 072	48 568	36 491	22 587	44 363	39 592	61 546	90 181	37 348
286	41 665	41 339	62 106	44 203	06 732	76 111	79 840	67 999	32 231	76 869
287	58 652	49 983	01 669	27 464	79 553	52 855	25 988	18 087	38 052	17 529
288	13 607	00 657	76 173	43 357	77 334	24 140	53 860	02 906	89 863	44 651
289	55 715	26 203	65 933	51 087	98 234	40 625	45 545	63 563	89 148	82 581
290	04 110	66 683	99 001	09 796	47 349	65 003	66 524	81 970	71 262	14 479
291	31 300	08 681	58 068	44 115	40 064	77 879	23 965	69 019	73 985	19 453
292	26 225	97 534	37 044	07 494	85 778	35 345	61 115	92 498	49 737	64 599
293	07 158	82 763	25 072	38 478	57 782	75 291	62 155	52 056	04 786	11 585
294	71 251	25 572	79 771	93 328	66 927	54 069	58 752	26 624	50 463	77 361
295	29 991	96 526	02 820	91 659	12 818	96 356	49 499	01 507	40 223	09 171
296	83 642	21 057	02 677	09 367	38 097	16 100	19 355	06 120	15 378	56 559
297	69 167	30 235	06 767	66 323	78 294	14 916	19 124	88 044	16 673	66 102
298	86 018	29 406	75 415	22 038	27 056	26 906	25 867	14 751	92 380	30 434
299	44 114	06 026	79 553	55 091	95 385	41 212	37 882	46 864	54 717	97 038
300	53 805	64 150	70 915	63 127	63 695	41 288	38 192	72 437	75 075	18 570
301	52 065	08 853	30 104	79 937	66 913	53 200	84 570	78 079	28 970	53 859
302	37 632	80 274	35 240	32 960	74 859	07 359	55 176	03 930	38 984	35 151
303	82 576	82 805	94 031	12 779	90 879	24 109	25 367	77 861	09 541	85 739
304	69 023	64 971	99 321	07 521	95 909	43 897	71 724	92 581	05 471	64 337
305	98 949	03 606	78 236	78 985	29 212	57 369	34 857	67 757	58 019	58 872
306	96 526	28 749	56 592	37 871	72 905	70 198	57 319	54 116	47 014	18 285
307	33 692	72 111	60 958	96 848	17 893	40 993	50 445	14 186	76 877	87 867
308	50 335	09 513	44 346	26 439	55 293	06 449	44 301	63 740	40 158	72 703
309	88 321	85 062	57 345	66 231	15 409	03 451	95 261	43 561	15 673	28 956
310	90 303	62 469	82 517	43 035	36 850	15 592	64 098	59 022	31 752	04 370
311	50 486	11 885	23 085	41 712	80 692	48 492	16 495	99 721	36 912	28 267
312	27 882	16 269	64 483	11 273	02 680	01 616	46 138	54 606	14 761	05 134
313	45 144	63 213	49 666	27 441	86 989	29 884	54 334	06 740	08 368	80 051
314	81 020	17 882	74 973	74 531	94 994	24 927	64 894	22 667	20 466	82 948
315	66 831	47 427	76 033	31 197	59 817	20 064	61 135	28 556	29 695	80 179
316	74 058	18 293	09 963	35 278	13 062	83 094	23 373	90 287	33 477	48 865
317	30 348	70 174	11 468	25 994	25 343	22 317	01 587	30 682	00 001	67 814
318	59 557	23 362	13 746	82 244	42 093	24 671	79 458	93 730	45 488	60 234
319	67 098	09 899	25 775	00 332	36 636	57 594	19 958	85 564	58 977	12 247
320	60 774	66 371	69 442	20 385	14 486	91 330	50 332	46 023	75 768	59 877

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Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
321	60 081	92 936	72 302	75 064	85 727	52 987	05 750	19 384	33 684	78 859
322	80 458	69 902	34 870	88 684	49 762	40 801	86 291	18 194	90 366	82 639
323	53 844	96 326	65 728	48 563	26 027	52 692	62 406	76 294	41 848	63 010
324	69 841	29 451	36 170	21 529	16 525	64 326	22 086	24 469	57 407	96 033
325	37 771	31 002	18 311	93 285	31 948	14 331	58 335	15 977	80 336	81 667
326	27 286	24 361	61 638	57 580	95 270	46 180	76 990	53 031	94 366	02 727
327	49 944	19 278	05 756	51 875	53 445	33 342	01 965	07 937	10 054	97 712
328	87 693	58 124	46 064	39 133	77 385	09 605	65 309	70 113	90 563	86 637
329	94 282	12 025	31 926	24 541	23 854	58 407	32 131	92 845	20 714	27 898
330	26 917	50 326	35 145	50 859	72 119	95 094	29 441	42 301	62 460	75 252
331	94 267	38 422	73 047	24 200	85 349	72 049	91 723	97 802	98 496	12 734
332	73 432	10 371	57 213	53 300	80 847	46 229	07 099	72 961	13 767	65 654
333	31 102	82 119	96 946	65 919	81 083	03 819	57 888	57 908	16 849	77 111
334	41 429	92 261	45 263	01 172	55 926	78 835	27 697	48 420	58 865	41 207
335	21 406	08 582	10 785	36 233	12 237	07 866	13 706	92 551	11 021	63 813
336	71 512	65 206	37 768	94 325	14 721	20 990	54 235	71 986	05 345	56 239
337	52 028	01 419	07 215	55 067	11 669	21 738	66 605	69 621	69 827	08 537
338	18 638	60 982	28 151	98 885	76 431	25 566	03 085	23 639	30 849	63 986
339	73 287	26 201	36 174	14 106	54 102	57 041	16 141	64 174	03 591	90 024
340	73 332	31 254	17 288	59 809	25 061	51 612	47 951	16 570	43 330	79 213
341	11 354	55 585	19 646	99 246	37 564	32 660	20 632	21 124	60 597	69 315
342	31 312	57 741	85 108	21 615	24 365	27 684	16 124	33 888	14 966	35 303
343	69 921	15 795	04 020	67 672	86 816	63 027	84 470	45 605	44 887	26 222
344	79 888	58 982	22 466	98 844	48 353	60 666	58 256	31 140	93 507	69 561
345	06 256	88 526	18 655	00 865	75 247	00 264	65 957	98 261	72 706	36 396
346	46 065	85 700	32 121	99 975	73 627	78 812	89 638	86 602	96 758	65 039
347	52 777	46 792	13 790	55 240	52 002	10 313	91 933	71 231	10 053	78 416
348	54 563	96 004	42 215	30 094	45 958	48 437	49 591	50 483	13 422	69 108
349	59 952	27 896	40 450	79 327	31 962	46 456	39 260	51 479	61 882	48 181
350	50 691	64 709	32 902	10 676	12 083	35 771	79 656	56 667	76 783	03 937
351	99 859	10 362	57 411	40 986	35 045	02 838	29 255	64 230	84 418	34 988
352	77 644	39 892	77 327	74 129	53 444	35 487	95 803	38 640	20 383	55 402
353	25 793	14 213	87 082	42 837	95 030	97 198	61 608	97 723	79 390	35 290
354	34 683	81 419	87 133	70 447	53 127	97 146	28 299	56 763	12 868	01 145
355	12 147	58 158	92 124	60 934	18 414	97 510	07 056	54 488	20 719	53 743
356	91 037	44 797	52 110	08 512	18 991	20 129	31 441	51 449	14 661	71 126
357	23 180	68 124	18 807	70 997	21 913	19 594	70 355	73 637	68 266	60 775
358	43 164	52 643	96 363	77 989	79 332	39 890	65 379	20 405	52 935	43 816
359	92 740	95 319	04 538	60 660	28 982	15 328	80 475	34 690	02 293	19 646
360	46 524	96 627	33 159	42 081	08 816	74 931	20 674	08 697	66 169	46 460

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Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
361	46 326	39 923	60 625	28 386	22 919	19 415	75 766	43 668	31 626	70 301
362	67 053	03 949	70 082	02 303	48 642	38 429	94 053	38 770	68 137	68 441
363	52 928	70 244	91 954	17 401	92 693	98 342	21 451	84 988	80 487	33 807
364	73 797	49 494	41 878	76 635	83 227	76 618	11 946	13 451	87 591	78 381
365	21 407	90 038	72 638	69 692	51 599	86 413	32 019	64 856	74 730	41 531
366	11 064	01 790	58 817	86 400	66 213	92 599	70 905	78 324	54 326	43 659
367	34 206	63 132	38 837	40 210	96 346	16 967	81 619	96 503	14 881	89 405
368	32 205	49 508	98 425	02 451	35 423	56 072	36 810	30 332	85 998	49 358
369	92 748	84 147	79 835	94 867	41 224	61 794	35 066	82 220	66 684	20 096
370	02 754	41 731	37 068	32 753	91 059	13 407	05 607	69 384	53 329	95 909
371	44 968	11 397	92 973	50 014	92 997	80 968	93 761	57 598	74 703	07 768
372	37 978	73 873	33 475	09 720	97 852	98 449	48 722	84 977	11 271	11 728
373	68 318	22 312	78 792	87 508	88 466	72 976	47 099	84 126	38 595	85 124
374	64 405	90 020	07 492	52 413	95 111	34 455	86 311	68 892	01 074	60 274
375	28 136	19 328	38 161	57 475	13 771	63 562	84 207	94 121	18 901	52 768
376	33 801	82 087	86 091	59 969	90 398	56 870	55 756	78 841	98 450	54 165
377	55 106	50 343	70 519	14 567	36 780	55 450	19 606	83 749	67 562	64 765
378	38 543	16 585	86 841	73 742	08 766	39 252	75 678	75 379	78 760	37 279
379	15 280	13 558	95 916	89 759	76 686	76 467	67 147	63 110	94 008	08 037
380	35 263	53 710	16 667	79 008	11 231	29 397	67 136	18 601	64 502	90 228
381	89 109	72 849	22 711	65 547	34 542	26 686	81 678	87 765	77 654	23 664
382	96 352	14 106	32 938	28 083	18 633	80 286	65 507	46 197	52 722	75 476
383	77 816	47 204	34 876	45 963	79 262	90 181	84 041	03 745	90 041	30 780
384	27 226	92 847	85 572	15 308	80 688	05 761	82 638	13 464	23 683	81 015
385	54 214	64 175	43 701	86 845	15 569	50 687	52 679	87 696	08 285	97 444
386	47 599	94 472	64 150	87 753	68 652	60 726	26 213	17 320	64 553	81 285
387	98 126	12 158	52 095	64 833	00 492	35 817	55 571	91 300	97 812	37 507
388	04 209	53 515	64 342	21 223	16 662	43 265	68 219	03 529	43 636	68 417
389	53 640	95 326	93 381	37 113	80 751	76 469	96 677	43 054	22 937	31 954
390	13 266	34 140	27 253	02 734	99 070	60 077	57 988	93 211	92 795	83 795
391	57 477	03 941	39 007	14 619	38 320	93 449	31 336	25 279	97 030	26 245
392	47 394	39 475	90 621	23 820	29 344	94 859	91 604	14 033	41 868	14 816
393	04 075	66 644	87 803	97 815	99 552	78 666	03 942	08 175	22 345	19 983
394	76 783	99 044	20 851	84 981	59 052	77 178	72 109	76 475	21 619	73 017
395	06 812	56 633	50 612	55 289	04 671	84 419	94 072	94 446	80 603	32 188
396	93 415	23 464	43 947	43 728	74 284	67 177	57 105	31 059	10 642	13 803
397	69 602	46 961	66 567	19 359	84 676	63 918	40 650	12 923	15 974	79 732
398	20 225	92 525	71 179	04 859	91 208	60 430	05 239	61 458	24 089	68 852
399	60 171	29 603	42 535	86 365	93 905	28 237	45 317	60 718	82 001	41 679
400	20 679	56 304	70 043	87 568	21 386	59 049	78 353	48 696	77 379	55 309

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Row No / Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
401	23 780	28 391	05 940	55 583	81 256	59 418	97 521	32 846	70 761	90 115
402	45 325	05 490	65 974	11 186	15 357	03 568	00 450	96 644	58 976	36 211
403	88 240	92 457	89 200	94 696	11 370	91 157	48 487	59 501	56 983	89 795
404	42 789	69 758	79 701	29 511	55 968	41 472	89 474	84 344	80 517	07 485
405	97 523	17 264	82 840	59 556	37 119	30 985	48 866	60 605	95 719	70 417
406	59 083	95 137	76 538	44 155	67 286	57 897	28 262	04 052	00 919	86 207
407	79 932	44 236	10 089	44 373	65 670	44 285	06 903	20 834	49 701	95 735
408	21 149	03 425	17 594	31 427	14 262	32 252	68 540	39 427	44 026	47 257
409	45 055	95 091	08 367	28 381	57 375	41 562	83 883	27 715	10 122	67 745
410	46 497	28 626	87 297	36 568	39 483	11 385	63 292	92 305	78 683	06 146
411	81 905	15 038	38 338	51 206	65 749	34 119	71 516	74 068	51 094	06 665
412	91 884	66 762	11 428	70 908	21 506	00 480	94 183	78 484	66 507	75 901
413	25 728	52 539	86 806	69 944	65 036	27 882	02 530	04 918	74 351	65 737
414	89 178	08 791	39 342	94 963	22 581	56 917	17 541	83 578	75 376	65 202
415	30 935	79 270	91 986	99 286	45 236	44 720	81 915	70 881	45 886	43 213
416	49 789	97 081	16 075	20 517	69 980	25 310	91 953	01 759	67 635	88 933
417	54 558	18 395	73 375	62 251	58 871	09 870	70 538	48 936	07 757	90 374
418	56 631	88 862	30 487	38 794	36 079	32 712	11 130	55 451	25 137	38 785
419	83 558	31 960	69 473	45 950	18 225	09 871	88 502	75 179	11 551	75 664
420	74 321	67 351	27 703	83 717	18 913	42 470	08 816	37 627	14 288	62 831
421	44 047	67 612	72 738	26 995	50 933	63 758	50 003	43 693	52 661	55 852
422	52 372	59 042	37 595	04 931	73 622	68 387	86 478	40 997	05 245	75 300
423	24 902	59 609	35 653	15 970	37 681	69 365	22 236	86 374	65 550	00 343
424	98 377	35 354	65 770	15 365	41 422	71 356	16 630	40 044	19 290	66 449
425	53 629	79 452	71 674	30 260	97 303	06 487	62 789	13 005	70 152	22 501
426	49 867	89 294	59 232	31 776	54 919	99 851	05 438	01 096	72 269	50 486
427	16 719	06 144	82 041	38 332	64 452	31 840	99 287	59 928	25 503	08 407
428	46 970	45 907	99 238	74 547	19 704	72 035	26 542	54 600	79 172	58 779
429	35 747	78 956	11 478	41 195	58 135	63 856	33 037	45 753	60 159	25 193
430	71 838	07 526	07 985	60 714	88 627	75 790	38 454	96 110	39 237	19 792
431	34 534	70 169	24 805	63 215	38 175	38 784	38 855	24 826	50 917	25 147
432	17 082	26 997	32 295	10 894	21 805	65 245	85 407	37 926	69 214	38 579
433	84 721	23 544	88 548	65 626	75 517	69 737	55 626	52 175	21 697	19 453
434	16 908	82 841	24 060	40 285	19 195	80 281	89 322	15 232	70 043	60 691
435	86 370	91 949	19 017	83 846	77 869	14 321	95 102	87 073	71 467	31 305
436	64 677	80 358	52 629	79 419	22 359	87 867	48 296	50 141	46 807	82 184
437	95 812	84 665	74 511	59 914	04 146	90 417	58 508	62 875	17 630	21 868
438	09 199	30 322	33 352	43 374	25 473	04 119	63 086	14 147	14 863	38 020
439	44 757	98 628	57 916	22 199	11 865	42 911	62 651	78 290	09 392	77 294
440	63 168	21 043	17 409	13 786	27 475	75 979	89 668	43 596	74 316	84 489

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Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
441	54 941	95 992	45 445	41 059	55 142	15 214	42 903	16 799	88 254	95 984
442	48 575	77 822	21 067	57 238	35 352	96 779	89 564	23 797	99 937	46 379
443	27 119	16 060	30 302	95 327	12 849	38 111	97 090	07 598	78 473	63 079
444	18 570	72 803	70 040	91 385	96 436	96 263	17 368	56 188	85 999	50 026
445	36 050	73 736	13 351	48 321	28 357	51 718	65 636	72 903	21 584	21 060
446	39 829	15 564	04 716	14 594	22 363	97 639	65 937	17 802	31 535	42 767
447	98 761	30 987	57 657	33 398	63 053	25 926	20 944	19 306	81 727	02 695
448	97 479	79 172	72 764	66 446	78 864	12 698	15 812	97 209	38 827	91 016
449	91 281	57 875	45 228	49 211	69 755	99 224	43 999	62 879	08 879	80 015
450	74 396	57 146	64 665	31 159	06 980	79 069	37 409	75 037	69 977	85 919
451	42 826	06 974	61 063	97 640	13 433	92 528	91 311	08 440	38 840	22 362
452	93 929	01 836	36 590	75 052	89 475	15 437	65 648	99 012	70 236	12 307
453	83 585	00 414	62 851	48 787	28 447	21 702	57 033	29 633	44 760	34 165
454	27 548	37 516	24 343	63 046	02 081	20 378	19 510	42 226	97 134	68 739
455	32 982	56 455	53 129	77 693	25 022	55 534	99 375	30 086	98 001	07 432
456	67 126	76 656	29 347	28 492	43 108	64 736	32 278	84 816	80 440	30 461
457	00 818	09 136	01 952	48 442	91 058	92 590	10 443	05 195	34 009	32 141
458	62 209	43 740	54 102	76 895	98 172	31 583	04 155	66 492	58 981	16 591
459	11 331	06 838	03 818	77 063	12 523	45 570	68 970	70 055	77 751	73 743
460	71 732	04 704	61 384	57 343	66 682	44 500	89 745	10 436	67 202	36 455
461	42 467	88 801	91 280	01 056	27 534	81 619	79 004	25 824	66 362	33 280
462	20 706	31 929	57 422	18 730	96 197	22 101	47 592	02 180	18 287	82 310
463	60 430	59 627	26 471	07 794	60 475	76 713	45 427	89 654	14 370	81 674
464	41 246	98 416	08 669	48 883	77 154	09 806	94 015	60 347	20 027	08 405
465	33 150	27 368	53 375	70 171	59 431	14 534	34 018	85 665	77 797	17 944
466	49 602	74 391	48 830	55 029	10 371	94 261	16 658	68 400	44 148	28 150
467	40 364	90 913	73 151	64 463	50 058	78 191	84 439	82 478	62 398	03 113
468	17 578	12 830	06 571	95 934	09 132	25 287	78 731	80 683	67 207	76 597
469	42 096	34 934	76 609	52 553	47 508	71 561	08 038	83 011	72 577	95 790
470	40 076	20 292	32 138	61 197	95 476	23 123	26 648	13 611	48 452	39 963
471	85 857	04 855	27 029	01 542	72 443	53 688	82 635	56 264	07 977	23 090
472	93 553	65 434	12 124	91 087	87 800	95 675	99 419	44 659	30 382	55 263
473	82 514	86 800	16 781	65 977	65 946	13 033	93 895	04 056	75 895	47 878
474	91 309	51 233	81 409	46 773	69 135	56 906	84 493	34 530	84 534	38 312
475	54 574	92 933	77 341	20 839	36 126	01 143	35 356	35 459	07 959	98 335
476	53 266	36 146	78 047	50 607	22 486	63 308	08 996	96 056	39 085	26 567
477	06 779	62 663	30 523	47 881	41 279	49 864	82 248	78 333	29 466	48 151
478	41 957	93 235	53 308	22 682	90 722	54 478	07 235	34 306	15 827	20 121
479	96 837	06 283	80 172	66 109	92 592	48 238	76 428	94 546	45 430	16 288
480	74 839	00 740	25 553	83 767	35 900	05 998	07 493	46 755	11 449	88 824

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Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
481	44 906	33 143	07 454	56 652	34 755	63 992	59 674	65 131	46 358	12 799
482	96 988	51 158	73 176	01 184	49 925	63 519	11 785	29 073	72 850	47 997
483	75 172	55 187	15 313	40 725	33 225	56 643	10 465	38 583	86 440	97 967
484	26 401	17 078	38 765	33 454	19 136	57 712	48 446	98 790	27 315	71 074
485	10 157	57 946	35 582	49 383	61 324	26 572	84 503	03 496	60 449	17 962
486	26 017	65 651	40 400	83 246	80 056	75 306	75 147	41 863	25 581	87 530
487	33 193	43 294	05 065	99 644	62 771	75 986	79 005	44 924	18 703	40 889
488	04 403	05 862	02 571	82 500	74 200	36 170	46 836	74 642	65 471	26 815
489	30 937	64 946	10 160	15 544	31 962	54 015	28 853	66 533	14 573	79 398
490	47 391	73 165	47 805	77 589	16 881	13 423	89 452	76 992	62 509	09 796
491	57 540	13 486	48 855	25 546	47 589	21 012	47 388	78 428	70 196	84 413
492	81 026	87 597	22 445	83 769	85 937	38 321	85 485	87 359	09 839	67 228
493	71 179	94 372	04 446	62 801	50 775	96 179	40 646	44 272	12 417	47 199
494	39 701	30 665	32 775	66 525	53 558	78 882	31 939	67 209	38 906	34 533
495	99 914	27 719	00 216	99 225	96 537	03 843	90 564	91 110	51 838	30 300
496	09 559	37 795	94 880	11 325	44 979	89 696	28 129	29 931	89 971	46 292
497	92 710	11 036	74 760	75 307	12 291	49 618	16 293	92 408	67 928	80 823
498	32 872	25 460	66 819	35 374	04 035	99 087	61 129	11 341	39 118	10 891
499	37 217	63 638	75 477	30 068	42 334	57 570	06 890	59 353	89 939	37 692
500	15 232	20 033	32 202	22 348	02 766	96 791	58 448	92 248	05 769	96 684
501	67 885	99 295	47 271	38 655	59 513	96 960	31 718	08 974	16 122	20 535
502	52 380	29 769	70 660	57 425	50 891	75 044	84 257	73 315	38 181	28 673
503	93 140	26 307	82 265	78 382	19 681	56 585	08 975	76 764	39 956	83 450
504	84 663	89 963	71 584	57 696	30 829	60 527	64 947	34 899	28 805	28 397
505	91 830	51 842	99 838	39 839	66 971	67 177	74 219	35 637	35 634	93 581
506	81 746	29 991	81 096	94 279	02 968	62 561	02 479	82 126	25 702	67 953
507	88 088	50 293	83 423	86 206	39 935	23 253	43 041	48 941	85 787	08 388
508	06 671	43 574	84 908	67 295	33 623	55 060	28 174	48 415	02 529	22 009
509	24 524	05 283	30 460	32 399	80 423	56 929	40 852	69 969	88 541	05 979
510	91 496	64 730	57 198	83 145	39 750	03 568	54 669	98 679	04 297	51 047
511	31 492	47 734	31 343	31 180	00 232	19 707	24 823	75 079	73 943	17 997
512	08 446	91 252	39 879	58 682	82 972	18 417	39 203	36 681	42 895	08 459
513	15 618	17 941	52 594	43 277	16 530	40 052	91 100	87 422	47 230	95 699
514	49 794	50 492	87 439	86 354	04 546	65 333	11 057	77 727	19 748	38 722
515	91 821	18 107	42 125	89 239	28 847	54 623	38 783	47 803	31 414	38 450
516	03 697	89 186	30 579	44 188	26 532	08 420	80 723	48 100	60 748	76 330
517	45 832	08 311	16 051	04 475	13 400	48 527	46 073	17 439	56 498	94 632
518	09 021	16 871	83 366	14 896	04 219	38 375	87 890	90 217	42 370	61 028
519	85 101	76 771	83 715	94 737	69 973	74 187	01 958	59 691	86 712	86 570
520	60 984	76 342	13 648	35 250	28 323	48 379	45 141	36 277	51 845	29 039

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Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
521	03 553	05 128	59 866	51 281	68 124	17 007	24 729	29 710	41 439	40 574
522	11 774	86 746	89 698	56 020	37 810	88 972	11 361	95 583	70 786	00 589
523	74 473	87 513	17 690	61 427	72 914	32 517	01 804	97 910	06 327	30 246
524	33 049	02 622	41 026	80 875	41 293	16 752	84 225	84 414	37 137	68 956
525	08 095	64 981	28 180	38 629	76 962	23 840	17 477	75 268	48 297	70 340
526	57 888	13 938	38 554	86 836	02 195	30 270	55 484	53 364	54 705	41 380
527	56 316	37 723	00 234	21 424	26 664	63 804	75 139	36 534	18 579	09 833
528	98 849	72 762	59 767	52 497	24 227	83 152	71 794	21 398	99 456	89 215
529	51 632	54 799	27 973	68 568	68 465	98 500	28 681	18 369	24 279	96 335
530	12 874	82 160	67 202	85 199	27 908	67 022	49 810	77 929	96 212	81 153
531	77 884	07 032	01 671	53 362	28 119	56 786	30 883	28 540	76 029	03 774
532	64 611	19 736	25 589	46 569	45 206	48 215	69 523	17 423	91 807	90 039
533	30 393	58 319	85 098	66 519	57 571	24 541	03 562	14 400	62 731	82 534
534	61 477	89 731	18 421	29 861	52 829	00 838	78 040	43 350	74 323	82 892
535	84 746	28 302	13 264	07 595	00 134	12 933	46 831	24 864	47 275	20 527
536	09 110	28 485	30 326	99 826	64 005	99 308	65 779	42 760	90 066	03 974
537	38 688	39 968	32 604	11 694	46 262	73 262	45 405	43 923	67 397	88 228
538	56 405	17 839	92 073	57 622	93 328	15 442	50 186	07 570	58 001	31 000
539	08 915	11 467	14 793	82 691	51 238	12 485	51 745	18 192	05 985	36 826
540	89 434	38 669	91 592	88 799	65 621	67 237	59 541	19 657	93 402	58 705
541	73 553	78 280	69 125	95 591	81 168	91 927	25 976	89 077	71 690	19 404
542	64 603	59 752	74 698	44 233	67 602	38 615	31 303	28 650	53 700	89 819
543	07 783	04 351	77 451	47 350	21 234	16 016	41 532	76 508	23 063	44 993
544	43 983	33 356	61 715	96 485	22 121	78 004	06 316	87 896	99 289	93 981
545	37 850	66 128	92 735	45 064	50 924	24 204	58 816	65 290	34 392	55 567
546	66 416	72 353	45 775	68 590	85 685	72 683	60 090	37 149	85 347	57 414
547	72 336	12 979	05 720	92 754	76 911	96 883	74 420	05 220	85 815	23 557
548	80 567	44 365	70 254	50 864	36 619	51 479	23 281	76 428	18 580	34 240
549	59 289	49 076	18 439	29 522	42 541	04 024	84 446	92 434	90 407	77 241
550	19 690	78 143	65 919	13 699	91 844	91 241	38 361	67 171	90 551	05 709
551	03 474	76 025	97 043	33 834	44 638	54 040	82 797	00 545	38 159	16 089
552	35 870	89 158	55 864	98 078	50 563	36 492	10 994	85 909	09 018	19 252
553	73 887	67 928	60 045	70 782	11 937	04 074	53 814	46 621	52 577	94 853
554	45 968	73 667	65 062	73 306	76 045	78 649	91 654	53 958	96 537	95 542
555	67 622	54 579	17 279	67 440	56 441	20 681	64 011	52 226	96 618	32 831
556	60 664	67 547	39 523	02 043	59 748	01 887	69 229	94 653	99 271	98 164
557	62 155	09 234	47 367	13 047	06 364	35 064	10 073	06 793	80 243	29 009
558	44 969	11 129	17 139	79 630	89 772	26 921	56 949	23 465	30 036	17 173
559	82 459	96 218	60 768	76 417	24 405	18 710	68 887	82 394	69 729	82 503
560	40 873	41 590	67 255	30 757	09 657	91 881	34 578	09 511	05 417	58 953

(*Continued*)

Row No. \ Col No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
561	18 532	10 721	22 029	48 524	47 778	00 881	83 489	03 464	57 462	97 459
562	96 689	39 755	39 547	00 740	36 666	07 993	31 671	86 304	12 970	73 402
563	52 849	31 652	79 655	11 250	18 463	57 518	20 306	25 301	01 374	51 208
564	33 298	87 662	61 849	60 923	68 685	69 411	39 266	80 320	34 844	89 416
565	81 569	83 651	35 795	40 168	33 501	010 42	58 931	03 892	85 188	74 740
566	85 476	23 790	33 842	89 565	53 359	25 579	59 049	62 394	72 435	12 457
567	21 904	18 370	97 035	57 905	09 581	91 227	92 754	37 760	01 411	07 440
568	87 175	88 318	63 242	85 960	56 690	12 618	30 493	11 569	73 723	07 448
569	58 830	00 157	65 814	21 118	22 140	73 793	57 855	81 830	06 795	13 183
570	12 625	30 635	56 429	73 216	12 342	36 722	83 886	96 828	82 870	90 954
571	97 614	02 370	42 160	73 370	11 944	49 067	59 452	80 495	43 911	46 712
572	17 033	68 037	41 963	03 874	44 856	82 985	57 453	84 358	16 120	04 454
573	76 624	00 405	62 369	55 080	61 880	51 270	87 807	10 653	36 894	70 850
574	35 660	00 234	14 705	93 418	94 084	82 856	25 384	71 555	56 754	78 315
575	18 291	91 656	98 079	52 384	43 306	65 205	75 903	58 701	99 496	50 048
576	33 557	87 793	90 857	10 143	46 726	84 284	43 635	41 213	83 845	70 986
577	91 408	80 220	05 728	68 890	46 577	21 152	43 759	43 301	93 661	97 252
578	50 106	10 099	13 722	18 572	44 024	00 351	18 173	23 717	85 114	85 998
579	57 782	63 951	53 723	86 853	63 851	79 430	49 181	46 386	69 666	55 743
580	76 162	71 724	40 028	94 786	34 457	16 906	90 040	30 789	40 281	94 697
581	96 584	81 907	04 055	53 990	66 397	80 579	42 517	78 181	39 251	09 467
582	67 097	95 523	66 568	63 632	71 048	15 581	39 904	75 774	77 495	75 994
583	29 911	65 690	41 178	47 712	70 355	16 998	56 005	05 230	10 093	71 495
584	34 784	70 950	54 680	57 811	53 782	39 145	36 829	85 342	40 406	35 883
585	45 668	03 459	29 870	78 252	70 088	70 621	67 153	05 737	40 933	91 075
586	93 335	86 853	15 860	81 167	91 259	16 118	52 401	83 593	84 474	02 423
587	75 608	39 646	90 871	70 284	82 100	96 032	05 115	63 678	02 225	88 087
588	58 581	44 364	57 468	21 539	13 042	64 150	63 754	05 210	87 644	54 114
589	64 013	63 562	41 388	32 397	74 152	23 982	71 982	71 700	33 026	66 477
590	47 838	46 712	39 848	35 083	65 927	97 868	11 067	76 771	71 799	43 836
591	41 014	97 025	93 225	08 511	63 096	26 628	73 012	12 543	76 269	99 708
592	02 629	49 845	73 677	19 193	14 924	57 236	95 564	15 010	59 667	73 773
593	78 515	02 624	99 744	13 585	33 746	58 771	94 785	62 628	99 585	11 363
594	80 832	59 979	09 444	78 700	02 596	85 984	69 438	16 913	96 475	93 283
595	18 625	77 086	45 911	39 746	64 722	39 938	43 930	54 619	00 302	50 384
596	02 738	75 714	75 249	95 439	80 714	52 555	47 266	96 190	78 750	94 973
597	83 669	16 479	53 163	48 071	28 000	45 011	26 733	67 132	83 362	84 162
598	43 028	08 415	27 236	52 651	89 059	64 844	80 910	01 676	91 752	57 815
599	26 264	03 415	57 532	29 981	61 200	96 036	62 600	20 068	56 530	38 487
600	08 432	89 514	26 883	69 165	97 237	22 361	55 276	39 902	95 927	82 190

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53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, Apurba Sinha Path, GUWAHATI 781003	54 11 37
5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001	320 10 84
E-52, Chitaranjan Marg, C-Scheme, JAIPUR 302001	37 38 79
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